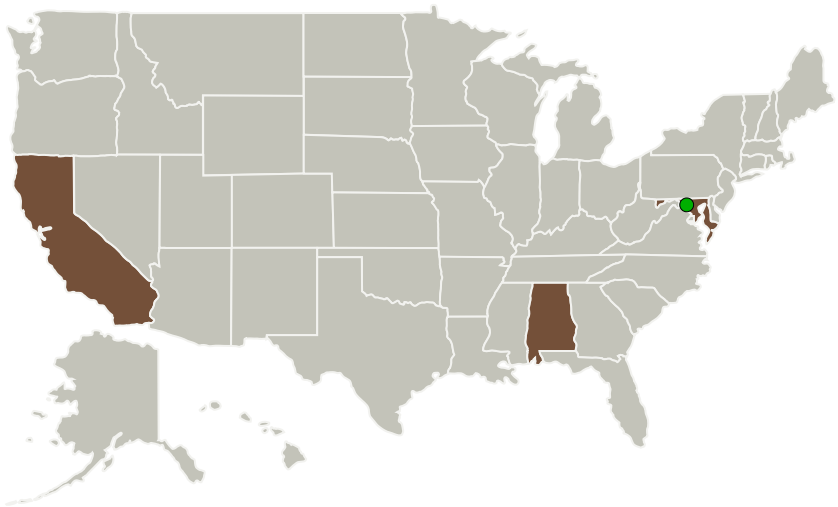
Miniaurizable, High Performance, Fiber-Optic Gyroscopes for Small Satellites, Phase I

Completed Technology Project (2012 - 2013)

Project Introduction

Small satellites require much lighter weight, smaller, and long life Attitude control components that can withstand stressing launch conditions and space vibration environments without compromising their performance. In particular, rate sensors that can provide high-resolution Line of Sight (LOS) stabilization, accurate inertial pointing and higher bandwidths are needed to support attitude and position determination from highly compact and very lightweight packages. IFOS, with a team having many years of pioneering experience in innovative Fiber-Optic Gyroscopes (FOGs), proposes to develop an advanced miniaturizable FOG based on an approach that would allow utilizing drastically reduced size components packageable into high performance attitude control sensor affording high degree of robustness against the shock and vibration that would maintain long term alignment in requisite space environment. IFOS will exploit novel techniques including new fiber components and coil production methods suitable for shorter wavelength operation, and vibration damping concepts that would be compatible with weight of less than 2 lb and volume under 150 cm3 for an Inertial reference Unit (IRU). Phase I will focus on feasibility study of the concept for 1-axis gyro, demonstration of critical components and simulation of vibration damping techniques needed to protect the sensor during launch and long term operation.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Intelligent Fiber Optic Systems Corporation	Lead Organization	Industry	Santa Clara, California
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
University of Alabama in Huntsville(UAH)	Supporting Organization	Academia	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	California
Maryland	

Project Transitions

February 2012: Project Start

February 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137650)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Fiber Optic Systems Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

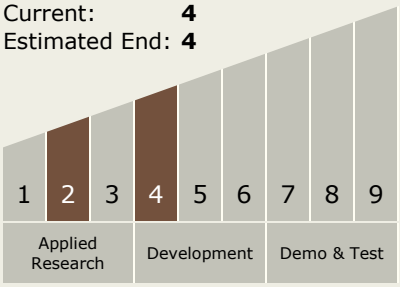
Carlos Torrez

Principal Investigator:

Joey Costa

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Completed Technology Project (2012 - 2013)

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.4 Attitude Estimation Technologies
    - TX17.4.3 Attitude Estimation Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System